

⑧

proposition	reason
$\begin{array}{l} A \rightarrow B \wedge C \\ \neg(B \wedge C) \\ \hline \therefore \neg A \end{array}$	rule #2
$\begin{array}{l} A \vee D \\ \neg A \\ \hline \therefore D \end{array}$	rule #4
$\begin{array}{l} \cancel{D} \\ \cancel{A \vee D} \\ \cancel{D} \\ \hline \therefore B \vee D \end{array}$	rule #5
$\begin{array}{l} B \vee D \\ B \vee D \rightarrow E \\ \hline \therefore E \end{array}$	rule #1

⑨ a) $\exists x \exists y (S(x) \wedge F(y) \rightarrow A(x, y))$

b) $\forall x \exists y (S(x) \wedge F(y) \rightarrow A(x, y))$

~~c) $\exists x \exists y (S(x) \wedge F(y) \rightarrow \neg A(x, y))$~~

~~d)~~

c) $\exists x \forall y (S(x) \wedge F(y) \rightarrow \neg A(x, y))$

d) $\exists x \forall y (F(x) \wedge S(x) \rightarrow \neg A(x, y))$

e) $\exists x \forall y (S(x) \wedge F(y) \rightarrow A(x, y))$

f) $\exists x \forall y (S(x) \wedge F(y) \rightarrow \neg A(y, x))$

⑩ a) true b) false because negative numbers don't have real square roots

c) true, when $x=0$

d) true, when $y = \frac{1}{x} (x \neq 0)$

e) true, when $x = \frac{1}{y} (y \neq 0)$

f) solve $\begin{cases} x+2y=2 \\ 2x+4y=5 \end{cases}$

there's no solution; thus the statement is false

g) solve $\begin{cases} x+y=2 \\ 2x-y=1 \end{cases} \Rightarrow \begin{cases} 2x-2+X=1 \\ y=1 \end{cases} \Rightarrow \begin{cases} x=1 \\ y=1 \end{cases}$

false because the values of x and y are fixed; not all x will yield a value of y that satisfies both conditions.